The Development of IPB Knowledge Management System (IPB-KMS)[1)]

by:

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Introduction

Knowledge management (KM) is a process that helps organizations identify, select, organize, disseminate, and transfer important information and expertise that are part of the organization's memory. Knowledge Management System (KMS) is an IT-Based system that is used to describe the creation of knowledge repositories, improvement of knowledge access and sharing as well as communicating information through collaboration, enhancing the knowledge environment and managing knowledge as a capital asset for an organization. In this paper, we discuss the KM concept, system and architecture; then we propose a framework of KM system implementation in collaborative environment for higher learning institutions, specifically at Bogor Agricultural University (IPB).

The knowledge management is very important in this globally competitive era since it helps organizations to gain competitive advantage and effective working through sharing and re-using knowledge. In higher education environments, KM initiatives are used to systematically leverage information and expertise to improve organizational responsiveness, innovation, competency and efficiency (RICE). There are many reasons why knowledge should be managed properly especially using the collaborative technology. Among these are information overload, technology advancement, increased professional specialization, competition, workforce mobility and turnover, and capitalization of organizational knowledge.

As one of the famous agricultural universities in Indonesia, IPB needs to facilitate the management of knowledge of its core competence through the development and implementation of IPB Knowledge Management Systems (namely IPB-KMS). With IPB-KMS, relevant knowledge accumulated within (particularly) and outside (generally) IPB can be systemized in a way that enables the optimal growth and use of knowledge by internal and external communities of IPB. Knowledge must be communicable, sharable, and growable among individual, working units of the organization for the purpose of learning, exploring, decision makings, and acting.

There are two types of knowledge: (1) ***tacit knowledge*** that is obtained by internal individual processes and stored in human beings and is sometimes described as experience, reflection, internalization or individual talent. (2) ***explicit knowledge*** that is stored in a mechanical or technological device, such as documents or databases. IPB-KMS manages the two types of knowledge to promote and to strengthen the core competence of IPB (Figure 1).

[1)] Case study in Bogor Agricultural University (IPB)

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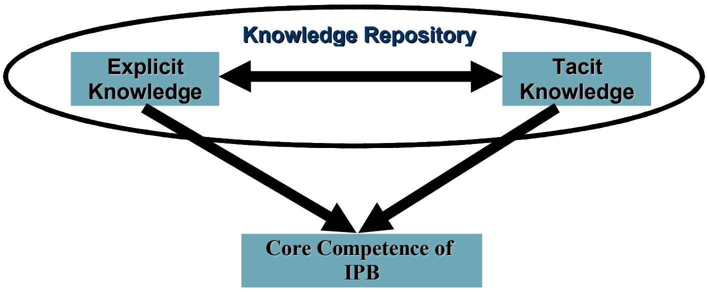

Figure 1. Relevant tacit and explicit knowledge is directed to the core competence of IPB.

The Architecture of IPB-KMS

Principally, the general architecture of IPB-KMS is comprised of three functional modules: (1) ***knowledge acquisition*** (2) ***knowledge maintenance*** and (3) ***knowledge utilization*** modules (Figure 2). The knowledge acquisition module is functioned for knowledge sources collection, codification and entry. The knowledge maintenance is functioned for knowledge structuring, processing, and storing. The knowledge utilization is functioned for knowledge sharing, delivering, and exploring.

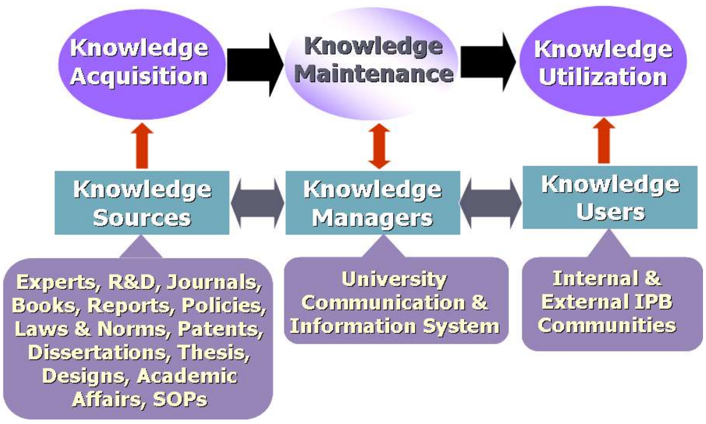

Figure 2. The general architecture of IPB-KMS.

The Strategy for IPB-KMS Development & Implementation

The strategy that is used for the development and implementation of IPB-KMS is focused on the institution core competence relevant to the vision and mission of IPB. That is, the development and application of science and technology (IPTEKS) for tropical agriculture. This strategy is outlined into several activities as shown in Figure 3.

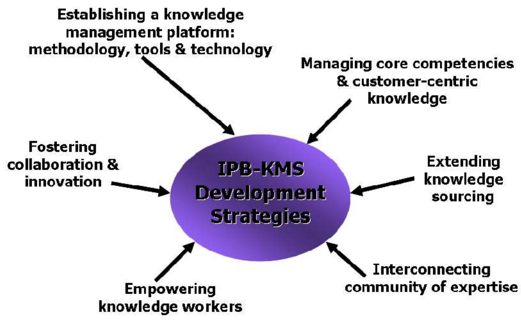

Figure 3. The Strategies for IPB-KMS Development

1. Managing core competence

1.1. User studies

This activity includes the analysis of perceptions and needs of users including lecturers, students, researchers, and supporting staffs of IPB. For this purpose, users survey has been conducted on these various users. The KMS Team has implemented a study on "Persepsi Sivitas Akademika IPB terhadap Pengembangan KMS". ("IPB Civitas Academica Perception on the Development of Knowledge Management System"). The document format is user needed see figure 4.

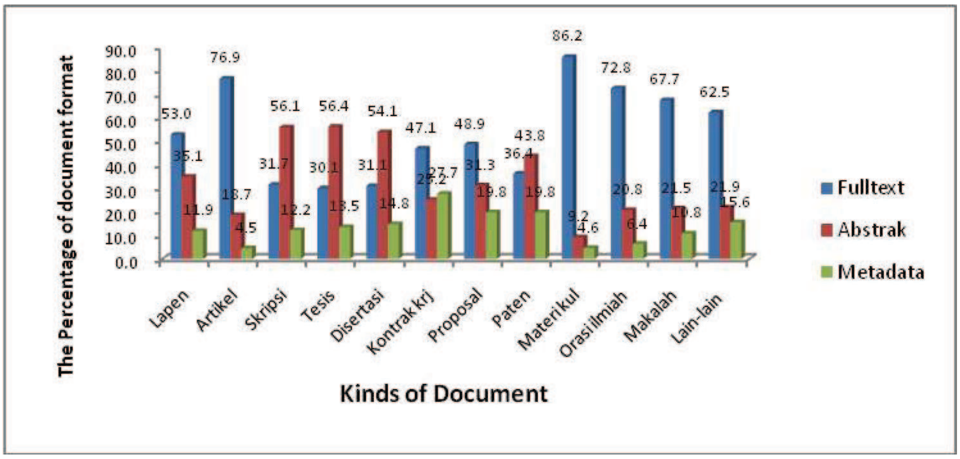

Figure 4. The document format needed by user

Socialization of the development of IPB-KMS program for those who will be expected to support, and involve in the implementation of the Scientific Knowledge Management system at the IPB. The Library expects that all faculty member of the IPB will support the proposed program and willing to participate in the development of the program. Preliminary socialization activities through Units, Centers, Departments and Faculties among the IPB have been carried out by library staff every Wednesday, during the ***"Rabuan***

Day" at the departmental level (routinely Wednesday meeting at department). In general, the Faculty members are willing to help implementing the KMS Program.

1.2 Identification of all sharable library items at all faculty libraries and research centers

Survey to identify of both explicit and tacit knowledge that exist at all Departments and Faculties, as well as other units under the Bogor Agricultural University had been implemented completely. Those scientific knowledge are scattered among the 81 (eighty one) units, under those Faculties, Departments and Library as well.

Mapping for the available knowledge resources of these units had been made based on the survey carried out. Type of the documents and they way they are being stored, human resources to handle, the infrastructure to be utilized for the management of those scientific knowledge are identified. Most those scientific knowledge resources are still in the manual form, remote users unable to access them digitally.

1.3.Examining the process compatibility of library item databases at faculty libraries and research centers

There are some variations of software platforms and database structures for document management, some of which must be made compatible with the platform of IPB-KMS.

- Majority of faculty libraries have used platform WINISIS developed by UNESCO and SIPISIS for Windows based on WINISIS developed by IPB Main Library
- Structure format have standardized using INDOMARC (Indonesian Machine Readable Cataloging) for bibliographic format
- The result of this identification is shown in Figure 5.

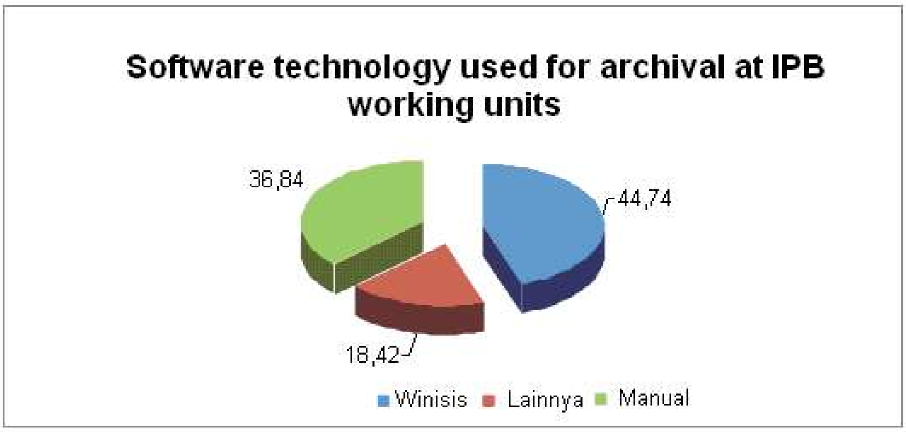

Figure 5. The percentage of software technology in various working units at IPB.

2. Extending knowledge sources

This activity includes the analysis of various forms and types of knowledge that result from various working units at IPB, i.e. departments, faculties, research centers, directorates and offices, libraries, supporting units, academic senate, and professor council. Field studies have also been conducted to other universities that have developed and implemented KMS.

The identification of varieties of documents potential as KMS resources such as MoU, Letter of Decree, Prototype, Scientific Oration, Meeting Notes, Maps (Site plan archive), patents, SOP/Policies have results for the formal & systematic cataloging system designed and implemented within KMS. This will enhance the maintenance and utilization of knowledge for the maximum benefit of IPB and global communities.

3. Interconnecting community of expertises

This activity includes the analysis of expertises of lecturers, students, researchers, and supporting staffs, and public partners that must be linked and activated in IPB-KMS. The readiness of IT infrastructure at some working units of IPB was also examined.

4. Empowering knowledge workers

This activity includes the identification of human resources at each working units of IPB which are potentially empowered and involved for knowledge acquisition, maintenance, and utilization. The identified personals are then invited and trained for the purpose of sustainable development and implementation of IPB-KMS in the long run.

User & worker training for document development, document sharing, and expert profile entry system have joined full session training with high enthusiasm (involved professors, doctors, and masters, and bachelors). The skill of staff & lecturers in producing KMS document (in digital form using multimedia) has been improved through the KMS training. The trainees are expected to propagate their knowledge & skill to other people in his/her working units. The establishment and distribution of printed and digitized brochures of user manual for IPB-KMS has been done in this activity. Participant of training development IPB-KMS are presented in Figure 6 and 7.

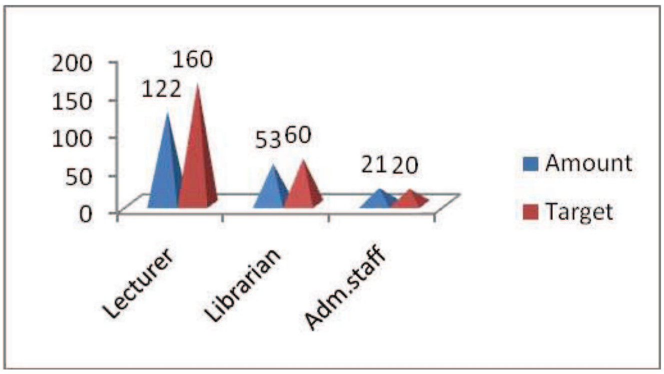

Figure 6. Participant of training development IPB-KMS

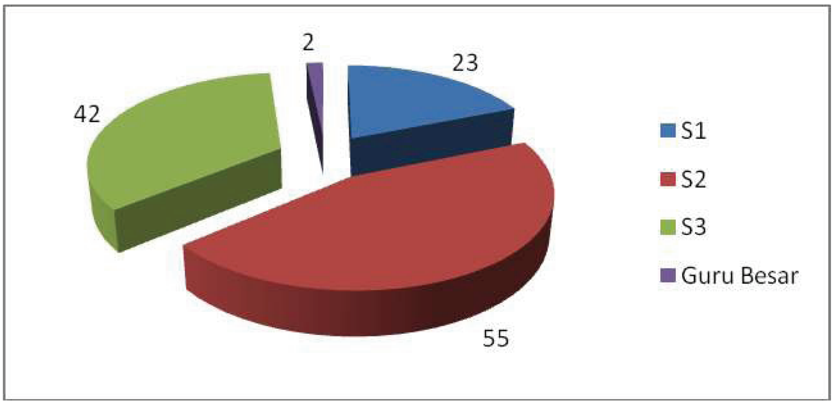

Figure 7. Lecturers Participant of training development IPB-KMS

5. Fostering collaboration and innovation

This activity focuses on the promotion of IPB-KMS through distribution of printed and digitized brochures and banners about IPB-KMS, user training/education, field visitations, openhouse, workshop, and exhibitions of IPB-KMS.

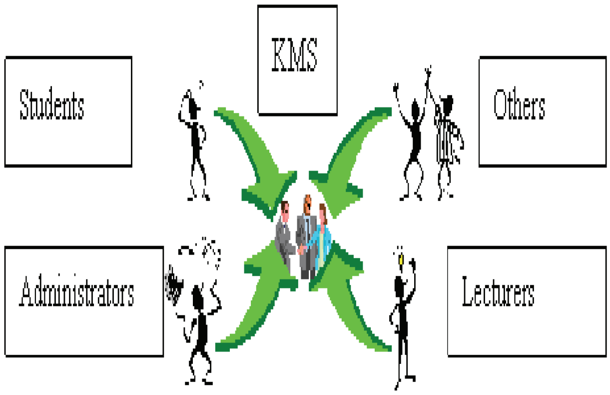

Figure 8. IPB-KMS as a knowledge collaborative environment

6. Establishing IPB-KMS Platform

This activity includes the development of IPB-KMS architecture and platform of technology (software, hardware, netware, data management) and platform human resources (brainware) to support IPB-KMS functions and activities. The core result of this activity is the installation of IPB-KMS in IPB official website, as shown in Figure 9.

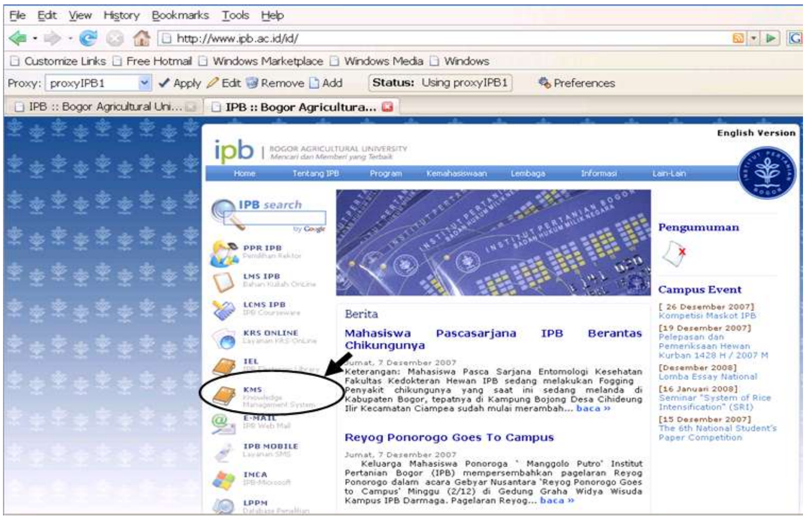

Figure 9. The upload IPB-KMS onto IPB Official Website.

Several faculty libraries have owned computer workstations and some of which are connected to the server at the faculty that can be connected to IPB-KMS. The software system already installed in 85% designated working units of IPB, as shown in Figure 10.

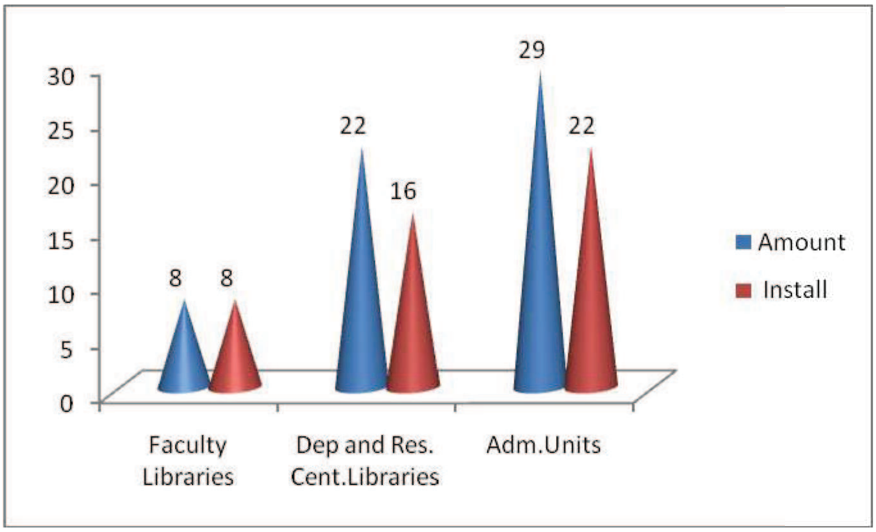

Figure 10. The Software System (IPB-KMS) already installed

For all identified document items (including scientific oration, patent, Archival document, letter of decrees, MoU, Proposal, Prototype, Master plan, SOP documents, maps) metadata have been fully designed, and currently the user interface is already completed with documents as shown in Table 1.

Table 1. The number of documents that have been stored at IPB-KMS.

No.	Type of Document	Type of Database	
		Metadata	Full text
1.	Article	1.795	1.478
2.	Thesis	7.847	1.531
3.	Disertation	1.319	715
4.	Archives	201	132
	Total	**11.162**	**3.856**

Socialization of the final full system has already conducted to 11 departments and attended by 183 lecturers. Socialization of the system has also perform for students and supporting staff form working unit within IPB. Large amount of useful criticism and suggestion from lecturers as well as from students for development of IPB-KMS are already implemented.

Installation and testing on the real server at main Library have been carried out, as shown in Figures 11-19. Figure 11 shows the top contributors of knowledge document in IPB-KMS with full-text, and the most recently added documents.

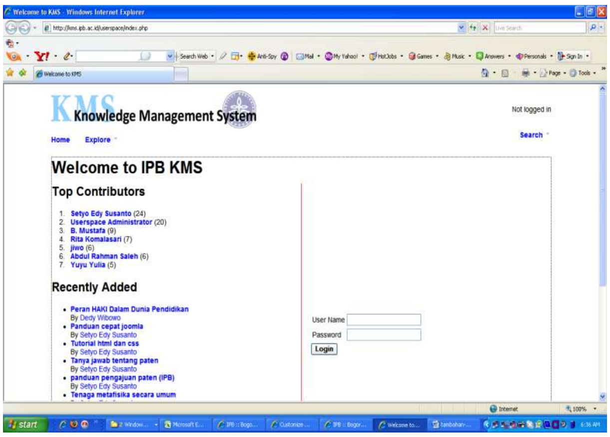

Figure 11. The main window display of IPB-KMS

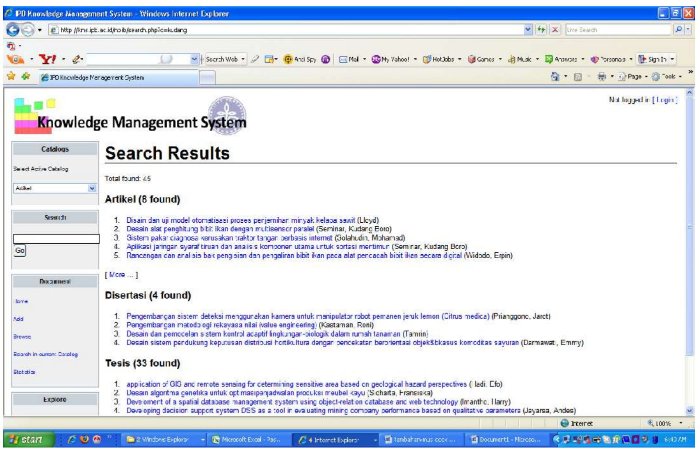

Figure 12. The search results of academic documents in IPB-KMS.

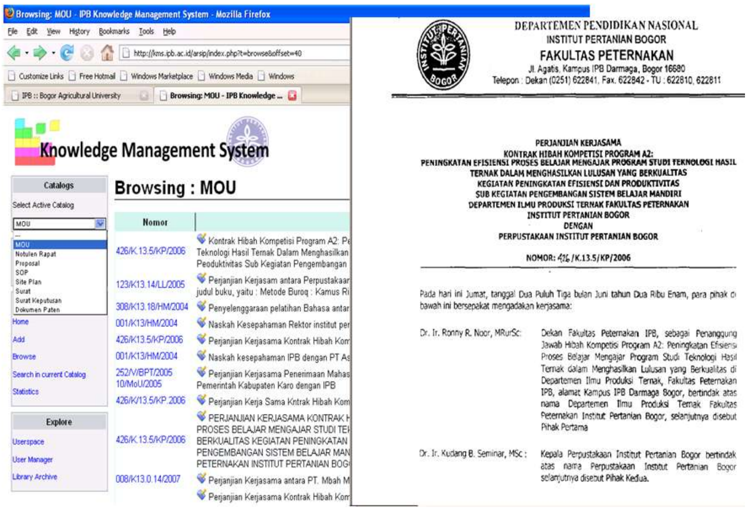

Figure 13. The search results of document (MoU)

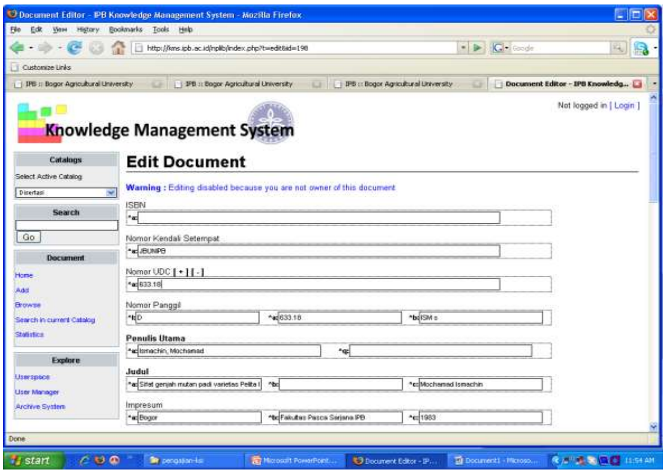

Figure 14. Edit documents facilities in IPB-KMS.

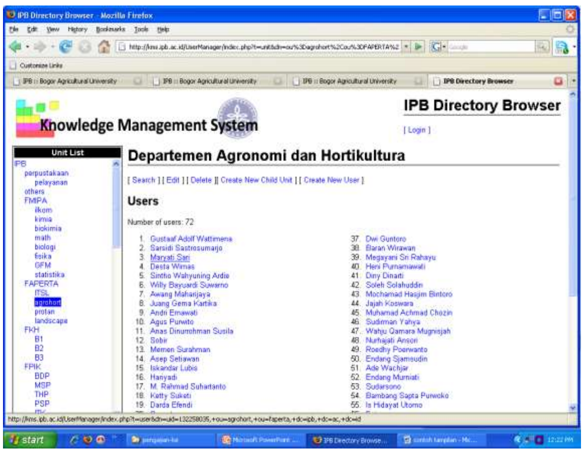

Figure 15. Users directory based on working units (left-side:unit list) in IPB-KMS.

Figure 16. Users directory based on working units (left-side:unit list) in IPB-KMS.

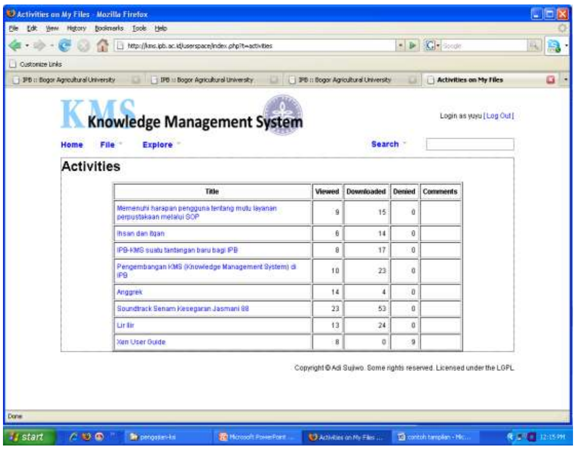

Figure 17. Monitoring of usage (#*viewed,* #*downloaded,*# *denied*) frequencies of documents.

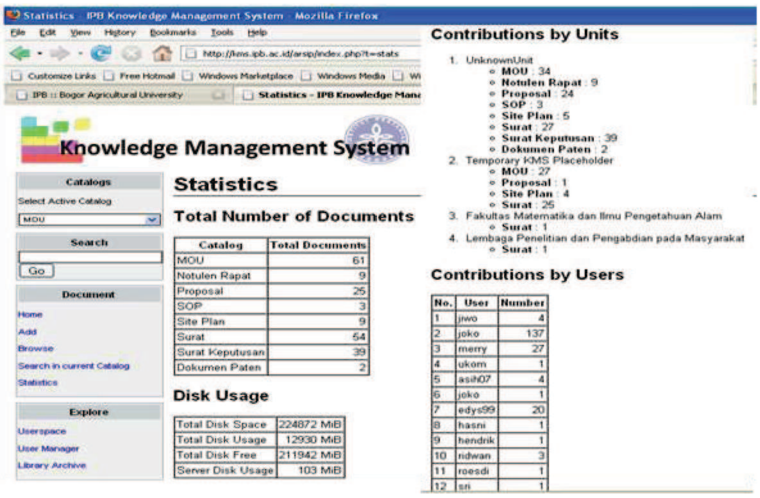

Figure 18. Statistic of document in IPB-KMS

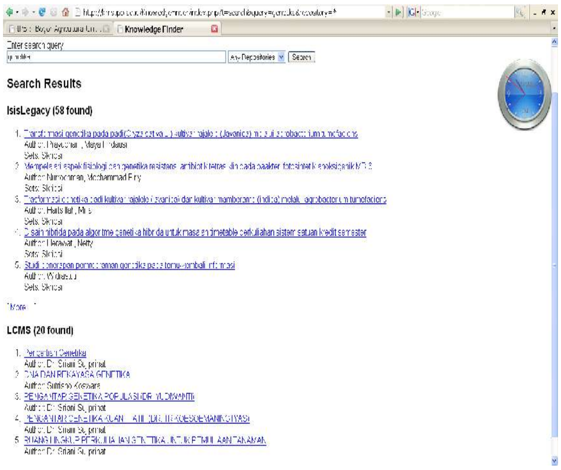

Figure 19. Example of broader search including LCMS that has been integrated with IPB-KMS.

Conclusion

The development of IPB-KMS and its full implementation will enhance the whole management of knowledge originating from all existing working units at IPB so that the accumulated knowledge stored in IPB-KMS can be shared, published, and exchanged among IPB users and other communities outside IPB. This will enhance the synergy of the whole managerial and operational activities comprising the "Tri Dharma Perguruan Tinggi" at IPB via knowledge sharing, publication and exchange and also will increase the participation of IPB communities (students, staff, researchers, and lecturers) to contribute to the development of IPB-KMS contents.

Integration of IPB-KMS with IPB e-learning (LCMS & LMS) system has also been done, enabling the broader knowledge acquisition through IPB-KMS. This also enabled by the implementation of *single sign-on system* for various applications run at IPB environment.

One the strategic efforts that must be developed in-line with IPB-KMS implementation is the establishment of legal aspects and policies from the top executive of IPB that underlie, govern and enforce the implementation and internalization of IPB-KMS in each working units.

To be operationally effective, this enforcement should be integrated with merit system (rewards and penalties). The continual improvement must also be done in response to dynamic change of needs. These are very crucial since it fundamentally reflects *institutional will and commitment* for the sustainable development and implementation of IPB-KMS in the long run.

We hope IPB-KMS is becoming the main priority system that must integratively support the knowledge creation, sharing, usage among academic communities particularly and public in general.

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